

| Table 2 Efficient Incentives Under Hybrid Price Caps with a 50/50 Sharing Mechanism | |
|--|--|
| Term of Plan | Efficiency Incentives Relative to Unregulated Markets |
| (Years) | (Percent) |
| 1 | 8 |
| 2 | 11 |
| 3 | 15 |
| 4 | 18 |
| 5 | 22 |
| 6 | 25 |
| 7 | 29 |
| 8 | 32 |
| 9 | 35 |
| 10 | 37 |

Without sharing, efficiency incentives would be at the 35 percent level (as shown in Table 1), far below the optimal level of 63 percent. The sharing mechanism goes in the wrong direction and reduces efficiency incentives. Sharing mechanisms have the additional drawback of making it more difficult to streamline regulation of selected services (see Section D).

3. Timing of Consumer Dividend

Under longer-term price-cap plans, the Consumer Dividend could be higher than under current plans. However, the incumbent regulatory commission may be unable to bind future commissions (or even itself) not to renegotiate the price-cap plan prior to the end of the term. Without a binding commitment, the firm most probably would be strongly opposed to a

commitment to a large Consumer Dividend. This has not been a problem with short-term price-cap plans, because the Consumer Dividends have been moderate (commensurate with expected efficiency gains). This would be a more serious concern with long-term plans, having large Consumer Dividends.

A solution to this problem is to have the Consumer Dividend automatically increase in the latter part of a long-term plan.⁴⁷ The higher levels of the Consumer Dividend would then be paid only after future regulatory commissions demonstrate good faith by not renegotiating the plan.

For example, suppose that the term of the price-cap plan were 10 years. The Consumer Dividend for the first 5 years could be set at a level appropriate for a 5-year plan.⁴⁸ At the end of the 5 years, the plan would *not* be renegotiated. However, there could be an automatic increase in the Consumer Dividend. The increase would apply until the end of the 10-year term. The increase in the Consumer Dividend could amount to some fraction of the expected incremental efficiency gains from having a 10-year plan instead of a 5-year plan.

D. Streamlined Regulation of Selected Services

Another way to enhance efficiency incentives is to streamline regulation in selected markets. Streamlined regulation would resemble the regulation of AT&T in the interstate jurisdiction for Baskets 2 and 3.⁴⁹ It would also resemble interstate regulation of other long-

⁴⁷The offset (over and above the Consumer Dividend) to reflect *historical* productivity may be constant during the term of the plan. Alternatively, it may move up or down to reflect expected *exogenous* changes in productivity; *e.g.*, as a result of competition.

⁴⁸The plan would also have an adjustment for inflation and for expected future productivity growth under ROR regulation. The adjustment for future productivity growth might differ from previous productivity growth in order to reflect expected further developments.

⁴⁹In its 1991 Interexchange Competition proceeding, the Commission determined that sufficient competition existed in certain market segments to allow some regulatory relaxation for all "basket 3" business services except analog private line services. The business services basket (basket 3) includes ProAmerica, WATS, Megacom, SDN, other switched services, voice grade and below private line service, and other private line service. 6 F.C.C. Rcd at 5881 & n.4. The Second Report and Order in Docket 90-132, released May 14, 1993, extended to all AT&T 800 services, except 800 directory assistance, the "further streamlined regulation" that was granted to most of AT&T's other large business services under an earlier order in the same proceeding. Price-cap ceilings, bands and rate floors no longer will apply to these services, which previously constituted AT&T's "basket 2" services under price-cap regulation. 8 F.C.C. Rcd 3668.

distance carriers. Under streamlined regulation, tariffs generally require no cost support and are rapidly approved.⁵⁰ In markets under streamlined regulation, the firm's earnings are not subject to regulatory oversight, and the firm has no guarantee of a fair return. The selected markets are subject to 100 percent of the efficiency incentives of unregulated competitive markets (instead of 18 or 35 percent).⁵¹

In this discussion, we assume that prices in markets not subject to streamlined regulation (unstreamlined markets) are governed by price regulation. During the period of the price-regulation plan, the prices in unstreamlined markets are limited by specific constraints; e.g., price caps. They are unaffected by whether other services have streamlined regulation. As a result, streamlining of regulation in selective markets is much easier under price regulation than under ROR regulation. The regulator must, of course, ensure that customers in streamlined markets are not subject to abuse of market power. However, he or she need not be concerned about the effect of streamlined markets on customers in *unstreamlined* markets. Price regulation, itself, affords the latter customers adequate protection. Indeed, that protection is an important benefit of price regulation (with no sharing mechanism).⁵²

Also, during the period of the incentive-regulation plan, costs need not be allocated between streamlined and unstreamlined markets. So long as there is no sharing mechanism, prices during the period would be unaffected by cost allocations. Foregoing cost allocations can greatly expedite the process of streamlining regulation, as streamlining becomes appropriate in particular market.⁵³

For these reasons, we focus below on potential abuse of market power (e.g., excessive rates and inadequate quality of service) in the markets to be streamlined. Under streamlining,

⁵⁰In the August 18, 1993 order (CC Docket 93-36), streamlining federal tariffing requirements for nondominant interexchange carriers' tariffs may be filed on one day's notice (see 8 FCC Rcd 6752).

⁵¹Efficiency incentives are no more than 35 percent under the current interstate price-cap plan, which has a four-year term. Incentives could be increased above 35 percent by adopting a longer-term plan.

⁵² This benefit is lessened if the incentive-regulation plan provides for sharing of earnings during the period of the plan. That lessening is an additional drawback of sharing mechanisms — over and above the dilution of incentives discussed in the previous subsection.

⁵³Regulators do, however, need to consider forward-looking costs when it comes time to renew the plan. They need to make sure that under the new plan, revenues in unstreamlined markets can cover the costs (including a fair return to capital) attributed to unstreamlined markets.

regulatory actions are no longer relied upon to prevent such abuse. The regulator must, therefore, ensure *in advance* that abuse of market power will not be a problem. That is the basis for selecting which markets are to be subject to streamlined regulation.

Firms in industrial markets almost invariably have some degree of market power.⁵⁴ The regulator must, therefore, develop a standard for “cognizable” market power. That is, regulation in a market can be streamlined if and only if the firm’s market power in that market does not exceed the cognizable limit.⁵⁵

Selecting an appropriate standard involves making a trade-off between the potential losses from abuse of market power under streamlined regulation versus the costs and infirmities of unstreamlined regulation. In particular, the regulator must determine whether the potential abuse of market power under streamlined regulation outweighs the 65 to 82 percent reduction of efficiency incentives (from 100 percent to 35 or 18 percent) under unstreamlined regulation.

Where customers have no reasonable alternatives to the company’s service, unstreamlined regulation is likely to be warranted. The large reduction in efficiency incentives, while unfortunate, must be endured. On the other hand, if customers *do* have reasonable alternatives, the benefits of unstreamlined regulation are unlikely to justify the large loss of efficiency associated with such regulation — not to mention the large direct costs of unstreamlined regulation.

E. Standard for Noncognizable Market Power

We would suggest the following standard for streamlined regulation of a service:

⁵⁴Market power may, for example, derive from product differentiation or from the firm’s location.

⁵⁵We use the term “cognizable,” since the above standard is analogous to “cognizable interest” under the Commission’s broadcast/cable cross-ownership rules; e.g., FCC rules on broadcast ownership (ownership of broadcasting stations by other broadcasting stations or by newspapers) barring “cognizable” interests (47 C.F.R. §73.3555).

- (a) Competitors offer comparable services at comparable (or lower) quality-adjusted prices;⁵⁶ and
- (b) Competitors can "reach" customers who account for a certain sizable fraction of total demand; *e.g.*, a competitor's network passes the customer or a competitor can reach the customer via LEC facilities.⁵⁷

Conditions (a) and (b) together define our proposed standard for noncognizable market power. The standard is *not* a market-share test and is far preferable to a market-share test. Our proposed test is whether customers have reasonable alternatives. A market-share test relates to how many consumers have actually adopted particular alternatives. Market-share tests have limited value as indices of market power.⁵⁸ In addition, using market-share tests for regulatory purposes perversely creates incentives for the incumbent firm to fail; *i.e.*, not to compete effectively. Declining market share often results from high cost of providing the service and/or poor quality of service. Favorable regulatory treatment based on reduced market share, therefore, rewards the firm for high cost and low quality; it punishes the firm for low cost and high quality.

We would further recommend that LECs be afforded substantial freedom to disaggregate services; *e.g.*, within a defined geographic area or jurisdiction in order to create a service that will pass the test for streamlined regulation. When regulation in a market is streamlined, the competitor naturally loses the protection of (industry-specific) regulation.⁵⁹ However, the competitor enjoys a large compensating benefit; namely, the LEC cannot cross-subsidize the streamlined service. In general, any price reductions to meet competition reduce the LEC's

⁵⁶Wireless service would, for example, satisfy this criterion if transmission quality were comparable to that of landline service and the price were only slightly higher. The slightly higher price would be balanced (quality-adjusted) by the advantage of portability.

⁵⁷This condition is intended to apply to outside plant and spectrum licenses. It is *not* necessary for competitors to have substantial excess capacity in central office equipment or circuit equipment, which can be quickly added as justified by demand.

Conditions (a) and (b), together imply that legal barriers to entry have been removed. They also imply that where equal access is necessary to compete, it has been provided.

⁵⁸See, for example, Franklin M. Fisher, *Industrial Organization, Economics, and the Law*, edited by John Monz, The MIT Press, Cambridge, MA, 1991, p. 15.

⁵⁹The competitor, however, continues to enjoy the protection of the antitrust laws, including the right to bring private antitrust suits.

bottom line. This lost revenue cannot be made up by raising prices in unstreamlined markets.⁶⁰

In general, the public interest is best served if regulators let competition freely operate in the market. The company should be allowed to disaggregate the part of a service that becomes competitive. By so doing, price-cap constraints eliminate any incentive to cross-subsidize and free the regulator from being forced to play the awkward role of referee in competitive markets. Absent streamlined regulation, the critical competition will take place in the regulatory hearing room — not in the market. That is unfortunate, since it is competition in the market that benefits consumers. Competition in the market yields lower prices, higher quality, and more rapid innovation. Competition in the hearing room yields ever more imaginative legal arguments. The regulatory process also facilitates cartelization of the industry, since price cutting must be disclosed and is subject to regulatory delay.

We propose that the standard for “sizable fraction” in Condition (b) be a fixed number. The number would be determined in a generic regulatory proceeding. The same number would apply to all services and markets being considered for streamlined regulation. Each individual service or market would then be tested separately to determine whether it meets the standard.

A generic standard for “sizable fraction” is appropriate, since streamlining should occur in many small markets. Determining a separate standard for each market or service would result in lengthy delays and large costs without providing commensurate customer benefits. The same result would occur if the standard was complex and/or unspecific; then a regulatory proceeding would be required for each case to determine the applicability of the standard. On the federal level, the administrative problems of developing separate standards for each service or market would be completely unmanageable. The goal should be to achieve rough justice, while strictly limiting administrative costs and delays.

⁶⁰Prices in unstreamlined markets will, of course, change over time, in accordance with regulatory policies. Allowable price changes do not, however, increase as a result of the firm's incurring losses in unstreamlined markets.

If our proposed standard were appropriately implemented, some markets, mainly in large metropolitan areas, would qualify for streamlined regulation today.⁶¹ Regulation of much of the transport market would be streamlined shortly after collocation is implemented. As competition evolves, more and more markets would be subject to streamlined regulation. Within 5 years, regulation should be streamlined in many LEC markets. Within 10 years, a sizable portion of LEC revenues should be subject to streamlined regulation. Indeed, events of the past few months portend an acceleration of competition that may require markets to be streamlined even more rapidly.

From an economics perspective, the further step of deregulation in selected markets would be constructive.⁶² If tariffs need not be filed, price cuts can be confidential. Each firm would then have greater opportunity to seize additional business before competitors became aware of the price cuts. The ultimate result would be more intense competition and lower prices to consumers.

F. Market Segments

Because of transactions costs and/or installation costs, competitors may be able initially to compete most effectively for only certain customers (based on characteristics such as size and/or location).⁶³ Consequently, some customers may have more and better competitive alternatives than others. For this reason, appropriate standards for streamlined regulation in some markets may differ for differently situated customers. More generally, competition may progress at varying paces in different market segments. That situation can best be handled by allowing the LEC to offer services that are similarly targeted to particular groups of customers. Those services may then meet the criteria for streamlined regulation. Remaining customers would continue to enjoy the protection of unstreamlined regulation.

⁶¹For example, Centrex has long faced stiff competition from PBXs. Special access services (particularly broadband) should also be afforded streamlined regulation in certain geographic areas.

⁶²We do *not* address federal or state *legal* concerns that may be raised by deregulation.

⁶³For example, some competitors, particularly providers of wireless services, may be able to serve small customers profitably.

It makes no sense for regulators to prevent LECs from offering services targeted to certain customers on the grounds of unreasonable discrimination. Where transactions and installation costs so indicate, the existing procompetitive regulatory policies already ensure that some customers will get lower rates than other customers. The key issue is whether the LEC will have an opportunity to compete effectively in all segments of the markets.

G. Discretionary Services

Arguments similar to the above can be made with regard to "discretionary" services. If the company raises the price of such a service, customers can exercise their discretion by refusing to buy it. This option limits the customers' loss. In addition, the prospect of lost sales makes it less likely that the company will raise rates in the first place.

For these reasons, the benefits of unstreamlined regulation of discretionary services are unlikely to justify the large reduction in efficiency incentives. We would therefore recommend streamlining the regulation of such services. Regulators would generally determine which services are discretionary, though there might be legislative guidelines. From an economics perspective, services should be classified as discretionary if their demands are sufficiently elastic to effectively discipline prices.

New telecommunications services that supplement existing offerings are generally discretionary and should be subject to streamlined regulation, for the reasons just discussed. This does not apply, however, to new services that displace basic services, which are then discontinued. Such new services are likely to be as essential as the services that they displace. Streamlined regulation of such a service would therefore be appropriate only if competitive suppliers provide comparable services and can reach customers who constitute a sizable fraction of demand.

Streamlining the regulation of new services (without earnings regulation) has the special advantage of encouraging successful innovations. It allows the firm to retain all the profits resulting from such innovations. Consumers also benefit through the availability of new alternatives. ROR regulation, on the other hand, limits the firm's upside potential, while imposing the risk of disallowances if the new service turns out to be unsuccessful.

Customers of discretionary and new services already have alternatives. Hence, the streamlining of regulation need not wait for any future expansion of competition. It should be done right away in order to bring customers the benefits of streamlined regulation.

IV. EFFICIENT PRICING

For decades, regulators have required telephone companies to price services in an economically-inefficient manner. Two important types of inefficient pricing are discussed in this section: (1) the overpricing of long-distance services (including long-distance access) in order to underprice local services; and (2) underdepreciation of plant.

Both types of inefficient pricing are politically popular but economically destructive. Such pricing may have made sense in an earlier era, when telephone penetration was low and competition was not present. Today, however, it simply constitutes bad public policy and will become increasingly counterproductive as competition intensifies over the next decade.

The challenge in this area is not to find a better way to price telecommunications services. That is easy. The challenge is to find a *politically feasible* way to phase out inefficient pricing practices. This goal must be accomplished before competition is ubiquitous in order to avoid serious dislocations; *e.g.*, very rapid price increases for consumers and/or financial distress for the incumbent or its competitors.

A. Overpricing of Long-Distance Services in Order to Underprice Local Services

Long-distance services are priced far above the levels that would obtain in a fully-competitive environment; *e.g.*, in a perfectly contestable market. Most local services, especially local usage (which is often free — *i.e.*, no usage-based charges), are priced below competitive levels.⁶⁴ The original rationale for such pricing was to promote universal service. However, universal service was, for all practical purposes, achieved long ago. Furthermore, the experience with Subscriber Line Charges (SLCs) in the 1980s demonstrates that telephone

⁶⁴For further discussion, see John T. Wenders, *The Economics of Telecommunications* (Ballinger Publishing Company: Cambridge, Massachusetts), 1987.

penetration can continue to increase, even though local access rates increase.⁶⁵ We can reasonably conclude that the rationale for the current inefficient pricing is outmoded.

The excess of price above marginal cost of interstate services amounts to at least \$7.0 billion per year. The excess of price above marginal cost is even greater at the state level — \$11.3 billion per year.⁶⁶ Reducing interstate and intrastate long-distance rates would greatly stimulate demand for long-distance services and provide additional value to customers. On the other hand, the compensating increases in local rates would have little effect on telephone penetration. The loss of penetration could be further reduced through more efficient means such as targeted (*i.e.*, means-tested) subsidies and/or offering lifeline service (low fixed monthly charge, high charges for originating local usage).

While inefficient pricing is undesirable in any event, it becomes unfeasible when there is competition. Competitors, even if they are not efficient, can easily undercut rates that are padded by regulators to include noneconomic costs. For example, interstate switched access rates are constructed to recover substantial costs from all the following categories:

- loop costs
- costs of the main distributing frame
- capital costs on underdepreciated plant

None of these costs depend on the amount of switched access that the LEC provides. Competitors can provide access, while avoiding some or all of these costs.

The inevitable consequence of this inefficient pricing is that competitors take customers away from the LECs — not because the competitors are necessarily more efficient or better at meeting customer needs — but because regulators do not require them to recover

⁶⁵Part of the reason for this is that usage of long-distance services is widespread. The benefits of the SLCs in the 1980s, that is, lower long-distance prices, were received by a group nearly as broad as the group paying the SLCs. See, *e.g.*, Alexander Larson, Thomas Makarewicz and Calvin S. Monson, "The Effect of Subscriber Line Charges on Resident Telephone Bills," *Telecommunications Policy* (December 1989).

⁶⁶See Jeffrey H. Rohlfis and Calvin S. Monson, *The \$20 Billion Impact of Local Competition in Telecommunications*, prepared for the United States Telephone Association, July 16, 1993.

noneconomic costs in their prices.⁶⁷ As LECs lose business, they lose the contribution they formerly received from that business. LECs must then, in order to cover their costs (including a fair return on cost of capital), raise other rates, to customers who do not have alternatives. The end result is neither equitable nor efficient.

The harms from inefficient pricing can be mitigated to some extent by allowing LECs to have downward pricing flexibility in competitive markets. However, as competition intensifies LECs are unlikely to be able to cover their costs unless they can make partially compensatory rate increases in certain less-competitive markets.

If LECs are *not* permitted to raise prices in less competitive markets, they will not be able to cover their costs. Ultimately, they will be unable to attract capital, and their portion of the telecommunications infrastructure will deteriorate.

Imposing charges on competitors who do *not* interconnect with the local exchange may be viable (even desirable) in the short term. However, regulatory monitoring is inherently difficult, especially if there are many small competitors. Enforcement is therefore likely to be troublesome. Consequently, imposing charges on competitors who do not connect with the local exchange is unlikely to be a satisfactory long-term solution to the problem of inefficient pricing.

In 1984-1985, the FCC considered whether to impose such charges on "bypassers" and decided that such a plan was not workable. At that time, the Commission acknowledged that the existing pricing structure provided artificial incentives for bypass, but it regarded the problem as non-urgent at that time.⁶⁸

The problem is urgent now. Well-funded competitors with ambitious growth plans already operate in a number of large cities. The Commission has recently ordered collocation and interconnection for switched and special access. As competition for transport services evolves, many customers will establish business relations with LEC competitors. That will facilitate the growth of end-to-end bypass, as well as competition for transport services.

⁶⁷Symmetric regulation of the incumbent and its competitors, on the other hand, allows only the most efficient firms to prosper and thereby improves industry performance. Streamlined regulation, where appropriate, also allows only the most efficient firms to prosper and *maximizes* industry performance.

⁶⁸For further discussion of this issue, see D. Weisman and D. Lehman, "The Industry That Cried Wolf," *Public Utilities Fortnightly* (July 1, 1993).

The Commission should immediately begin to phase out regulatory policies whose social welfare benefits no longer outweigh the growing costs of inefficient pricing. Such action will become progressively more difficult over time, as competitors grow. Competitors will make sizable investments and hire employees, based on the current rate structure. The dislocations resulting from restructuring will become more serious and more difficult to remedy, the longer that restructuring is delayed.

Eliminating inefficient pricing entails rate reductions in long-distance services (including long-distance access) and rate increases for local services. On the interstate level, increasing subscriber line charges (SLCs) is one way to accomplish these goals. Unfortunately, increasing the SLC for residents and single-line business turned out to be politically volatile when it was attempted in the mid-1980s. Yet, in the long term, the best way for regulators to ameliorate the problems of inefficient pricing is to give LECs some discretion to price in response to market conditions, rather than subject to inflexible regulatory rules. This might involve raising local rates where appropriate and in accordance with regulatory guidelines, while lowering long-distance access charges.⁶⁹ Political sensitivities can be assuaged to some extent, but not entirely, by restructuring prices gradually over time. Gradual restructuring will be possible only if it begins very soon.

In the meantime, the Commission should take measures to ensure that inefficient pricing does not lead to inefficient competition; *i.e.*, that inefficient pricing does not attract competitors who can survive only because of regulators' set prices of competitive services far above cost in order to underprice other services. Such policies should be competitively neutral and minimize inefficiencies.

Part of the solution is to have a general policy that includes an appropriate and clearly-defined contribution element in the charge for interconnection. However, end-to-end bypass from the customer to the interexchange carrier does not involve interconnection. Consequently, an interconnection charge would not apply to end-to-end bypass. An interconnection contribution element could, therefore, solve only a small part of the problem. Additional measures are necessary to avoid encouraging uneconomic end-to-end bypass.

⁶⁹In this paper, we do not address the legislative alternative of raising taxes to support low rates for local telephone services.

In the long term, regulatorily-imposed inefficient pricing harms consumers of noncompetitive services. If customers have competitive alternatives, they will ultimately adopt them if the cost savings are appreciable. As competition grows, more and more customers will have competitive alternatives. The burden of inefficient pricing will, therefore, have to be borne by a smaller and smaller group of customers, who will each have to pay increasing amounts. Before that process goes too far, rates should be restructured to eliminate inefficient pricing.

B. Underdepreciation of Plant

For decades, regulators have not allowed telephone companies to depreciate plant as rapidly as the value of the plant declines. Depreciation methods do not reflect the rapid obsolescence of high-tech equipment.

Table 3 compares depreciation of LECs with that of a variety of other high-tech firms. LECs have far less accumulated depreciation than any of the other firms. Furthermore, LECs take less annual depreciation expense (as a fraction of gross plant) than any of the other firms; so the problem is getting worse, not better.

Table 3
Annual Depreciation and Amortization Expense and Accumulated
Depreciation and Amortization as a Percent of Gross Property, Plant and
Equipment for Local Exchange Carriers (LECs) Versus Other High-Tech Companies
1991

| | | | | As a Percent of Gross Property, Plant and Equipment | |
|---|--|--|---|--|--|
| | Depreciation and Amortization Expense | Accumulated Depreciation and Amortization | Gross Property, Plant and Equipment | Depreciation and Amortization Expense | Accumulated Depreciation and Amortization |
| | (Thousand Dollars) | | | (Percent) | |
| | (1) | (2) | (3) | (4) (1)÷(3) | (5) (2)÷(3) |
| All Reporting LECs | \$16,910,113 | \$93,642,648 | \$246,449,644 | 6.9% | 38.0% |
| Apple Computer, Inc.* | 204,400 | 588,000 | 1,036,000 | 19.7 | 56.8 |
| Xerox Corporation | 695,000 | 2,690,000 | 4,795,000 | 14.5 | 56.1 |
| Texas Instruments Inc. | 590,000 | 2,007,000 | 4,361,000 | 13.5 | 46.0 |
| Digital Equipment Corporation (DEC) ^b | 827,000 | 3,651,000 | 7,429,000 | 11.1 | 49.2 |
| Hewlett-Packard Co. | 624,000 | 2,616,000 | 5,961,000 | 10.5 | 43.9 |
| McDonnell Douglas Corp. | 499,000 | 2,948,000 | 5,255,000 | 9.5 | 56.1 |
| International Business Machines (IBM) | 5,150,000 | 28,100,000 | 55,678,000 | 9.3 | 50.5 |
| American Telephone & Telegraph Co. (AT&T) ^c | 3,568,000 | 21,203,000 | 39,892,000 | 8.9 | 53.2 |
| Litton Industries, Inc. | 219,834 | 1,214,988 | 2,525,439 | 8.7 | 48.1 |
| General Electric Co. | 2,654,000 | 13,741,000 | 32,073,000 | 8.3 | 42.8 |
| Corning Incorporated | 231,300 | 1,380,100 | 2,809,700 | 8.2 | 49.1 |
| MCI Communications Corp. | 776,000 | 3,987,000 | 9,684,000 | 8.0 | 41.2 |
| The Boeing Co. | 826,000 | 5,070,000 | 10,600,000 | 7.8 | 47.8 |
| Westinghouse | 360,000 | 2,544,000 | 5,070,000 | 7.1 | 50.2 |
| The Dow Chemical Company | 1,465,000 | 11,888,000 | 20,663,000 | 7.1 | 57.5 |

*Data based on Fiscal Year Ending September 27, 1991.

^bData based on Fiscal Year Ending June 29, 1991.

^cAT&T is partially regulated by the FCC.

Source: All Reporting LECs: FCC, *Statistics of Communications Common Carriers*, 1991/1992 Edition, pp. 8, 38 and 41.
Other Companies: *Moody's Industrial Manual and Public Utility Manual*, 1992 and *Standard & Poor's Corporation Records*, 1993.

One might try to justify the low LEC depreciation rates on the basis of their investment in long-lived outside plant. However, that argument is becoming more and more strained, as high-tech fiber-optic cable is replacing low-tech copper cable. Indeed, embedded copper wire becomes worthless in an economic sense when fiber optics is deployed. Fiber optics can offer services (such as voice, data applications, and a whole host of broadband services) and requires substantially less maintenance than copper. Furthermore, fiber optics is digital and can be interconnected less expensively to digital switches and digital PBXs. All these considerations argue in favor of rapid depreciation of embedded copper plant.⁷⁰

Depreciation in the cable television industry is relevant in this regard. Cable companies have a large fraction of their plant investment in outside plant. Like LECs, cable companies have substantial embedded investment in copper (coaxial cable) and are gradually upgrading to fiber. Table 4 shows depreciation of cable multiple system operators (MSOs) that do not have sizeable holdings other than cable companies.⁷¹ All the cable MSOs in the table depreciate plant about two to three times as rapidly as LECs.⁷²

⁷⁰For further discussion of this issue, see Michael J. Marcus and Thomas C. Spavins, "The Impact of Technical Change on the Structure of the Local Exchange and the Pricing of Exchange Access: An Interim Assessment," unpublished draft. See also Jeffrey H. Rohlfs, Charles L. Jackson, Harry M. Shoosban III and Susan W. Leisner, 'Miles to Go': *The Need For Additional Reforms In Capital Recovery Methods*, presented at the National Economic Research Associates, Inc. Telecommunications In A Competitive Environment Seminar, Scottsdale, Arizona, April 12-15, 1989.

⁷¹We attempted to include as many large cable MSOs as possible in the table. However, many large MSOs, such as TCI, ATC (subsidiary of Time Warner) and Cox are excluded, since they have sizable noncable holdings.

⁷²Cable MSOs have relatively little *accumulated* depreciation, since they are growing so rapidly and much of their plant is relatively new.

Table 4
Annual Depreciation and Amortization Expense and Accumulated
Depreciation and Amortization as a Percent of Gross Property, Plant and
Equipment for Local Exchange Carriers (LECs) Versus Cable TV Companies
1991

| | | | | As a Percent of Gross Property, Plant and Equipment | |
|---------------------------------|--|--|---|--|--|
| | Depreciation and Amortization Expense | Accumulated Depreciation and Amortization | Gross Property, Plant and Equipment | Depreciation and Amortization Expense | Accumulated Depreciation and Amortization |
| | (Thousand Dollars) | | | (Percent) | |
| | (1) | (2) | (3) | (4) (1)÷(3) | (5) (2)÷(3) |
| All Reporting LECs | \$16,910,113 | \$93,642,648 | \$246,449,644 | 6.9% | 38.0% |
| Comcast | 164,299 | 340,628 | 845,452 | 19.4 | 40.3 |
| Comcast/Phila- delphia, L.P. | 16,218 | 38,207 | 97,205 | 16.7 | 39.3 |
| TCA Cable | 34,007 | 119,649 | 229,279 | 14.8 | 52.2 |
| Galaxy Cable M.L.P. | 7,479 | 26,608 | 53,531 | 14.0 | 49.7 |
| Adelphia | 79,427 | 211,599 | 580,370 | 13.7 | 36.5 |

Note: Accumulated depreciation for cable companies is derived from Gross Plant less Net Plant.

Source: All Reporting LECs: FCC, *Statistics of Communications Common Carriers*, 1991/1992 Edition, pp. 8, 38 and 41.
Cable Companies: Paul Kagan Associates, Inc., *The Cable TV Financial Databook*, June 1992, pp. 58 and 72.

Underdepreciation of LEC plant amounts to a huge sum. To put the LEC industry on the same sound footing as the unregulated firms in Table 3, regulators would need to authorize approximately \$25 billion of depreciation.⁷³

Underdepreciation is best understood as a giant regulatory Ponzi game. Regulators in the past have (with the best of intentions) chosen not to fund the cost of telephone service fully, but to pass part of the costs on to the next generation; the next generation of regulators

⁷³The additional depreciation described above is the total amount, while the figures calculated in the previously cited Monson-Rohlf's study are annual costs. This figure includes both federal and state depreciation components.

passed an even larger burden on to the next generation; and so forth. So long as this game can be continued indefinitely, all generations of ratepayers benefit.

Unfortunately, however, the Ponzi game ends, and the bubble bursts, when competition becomes widespread in the industry. Prices in competitive markets are limited by the costs of competitors. They cannot be raised simply because regulators in the past chose not to fully fund the cost of telephone service in their generation. As more and more markets become competitive, the only choices will be to raise rates to the shrinking group of monopoly ratepayers or to deny the company a fair return on its investment. The former is inequitable and politically unacceptable; while the latter reduces LECs' access to capital markets and inevitably leads to a decline in their portion of the telecommunications infrastructure. To avoid this unpleasant choice, current regulators must deal with the \$25 billion problem they inherited from past Ponzi players — before competition becomes ubiquitous.

1. Depreciation Under Price Caps

Increasing the rate of depreciation of an item of plant raises expenses in the short term, but decreases expenses farther in the future. Under ROR regulation, the company is afforded the opportunity to recover its prudently-incurred expenses, including depreciation. Consequently, increases in depreciation under ROR regulation translate directly into price increases in the short term. The company generally has the incentive to petition for higher depreciation rates. Higher depreciation expense, together with increased revenue to match the higher depreciation, increases cash flow in the present and reduces risk in the future. On the other hand, regulators have resisted price increases, because of the political implications of increasing short-term prices.

The incentives differ under price caps. Under pure price regulation, increases in depreciation rates are usually *not* treated as exogenous cost increases, which are flowed through to customers. Consequently, increases in depreciation do not generally translate into price increases. They simply lower the company's reported earnings. Consequently, the company has much less incentive to petition for increases in depreciation rates. Under price

caps with a sharing mechanism, part of the depreciation increase flows through to customers in the form of higher prices. Part flows through to stockholders in the form of lower reported earnings. The company's incentives to seek increases in depreciation are still less than under ROR regulation. Because of these incentives, it is hardly surprising that the problem of underdepreciation actually has gotten (slightly) worse under price caps.

Treating increases in depreciation rates as "exogenous" cost increases would be better than the *status quo*. However, that policy would simply restore the pre-price-cap incentives, which also led to underdepreciation.

The FCC recently took action to reduce unnecessary bureaucracy in the process of prescribing depreciation rates;⁷⁴ yet this action cannot realistically be expected to solve the problem of underdepreciation. If a price-cap LEC unilaterally increases its depreciation rates, it suffers a financial loss (lower reported earnings) with no commensurate compensation.⁷⁵ Consequently, it has little incentive to do so. As a result, the problem of underdepreciation is likely to persist.

Further measures are required to solve the problem of underdepreciation. The best approach is for regulators and LECs to agree on an ambitious specified schedule for reducing the value of assets on the regulatory books as part of a price-cap plan. The devaluation of assets would not correspond directly to rate increases and would therefore reduce the company's reported earnings. The Commission would therefore (*ceteris paribus*) need to make concessions elsewhere in the plan in order for the plan to be acceptable to the company.

⁷⁴FCC, In the matter of Simplification of the Depreciation Prescription Process, CC Docket No. 92-296, *Report and Order* (adopted September 23, 1993, released October 20, 1993).

⁷⁵The financial loss is manifest when the price-cap plan is renewed. Regulators must set the terms of the new plan so that the LEC has the opportunity to recover and earn a fair return on the rate base. However, the rate base is reduced if the LEC previously unilaterally increased depreciation rates. As a result, the LEC would have less bargaining leverage to negotiate favorable terms for the new price-cap plan.

V. PRICING FLEXIBILITY

For purposes of this section, we assume that the firm's prices, other than for selected services subject to streamlined regulation, are limited by some overall constraint; *e.g.*, price caps or a ROR constraint. We then consider what limitations should be placed on the firm's freedom to restructure rates *within* the overall constraint.

Under ROR regulation, regulators generally have the power to set prices for each individual rate element. In practice, however, the firm has typically been afforded some pricing flexibility within the overall earnings constraint.

Pricing flexibility is more explicit under price regulation. The firm is free to restructure rates, so long as the new rates satisfy specific constraints. In the FCC plans, price-cap constraints must be satisfied individually for each of several specified baskets of services. In addition, changes in average prices for "services" (which are precisely defined sets of rate elements) must be within specified bands.

In analyzing pricing flexibility, we first note that the firm almost surely understands its costs and demand better than the regulator does. Consequently, rates set by the firm are much more likely to reflect actual (relevant) costs and actual market conditions than would rates set by regulators. This argues in favor of giving the firm some discretion in setting rates to achieve the economic benefits of more efficient pricing.

Absent sufficient competition or regulatory constraints, the firm may have an incentive to choose some rates that are not in the public interest. A firm with market power would obviously have the incentive to set overall rates too high, apart from regulatory constraints. Here, however, we are assuming that the firm's overall rates are limited by price-cap constraints. Thus, the issue is whether the firm, in meeting that overall constraint, has an incentive to set some rates too high and others too low.

An important academic result bears on this issue. In 1979, Vogelsang and Finsinger⁷⁶ analyzed the regulatory regime under which only the firm's overall price level is constrained;

⁷⁶I. Vogelsang and J. Finsinger, "A Regulatory Adjustment Process for Optimal Pricing by Multiproduct Monopoly Firms," *Bell Journal of Economics* 10(1), 1979: 157-71; see also Ingo Vogelsang, *Price Cap Regulation of Telecommunications Services: A Long-Run Approach* (Santa Monica, Calif.: The RAND corporation, 1988), vii-ix, 24-25.

that is, there are no additional constraints on individual prices or sets of prices (*e.g.*, baskets). Vogelsang and Finsinger found that the firm under this regulatory regime will tend, in the long-term, to price efficiently. Ultimately, the prices that maximize economic efficiency also maximize the firm's profits. Thus, regulatory intervention in setting individual rates cannot be justified on the basis of general economic efficiency.

There are, however, two considerations that might lead to regulatory intervention. First, economically-efficient rates might not be politically palatable. In this regard, we presume that regulators will limit the firm's freedom to raise local rates and lower long-distance rates. We have previously argued that regulators should, indeed, give LECs discretion to raise local rates where appropriate, while lowering long-distance access charges. One cannot, however, realistically propose that the firm be given unlimited freedom to restructure these rates as it chooses, without regulatory oversight.

At the local level, political concerns have led regulators in the past to price residential service low relative to business services and to price basic services low relative to discretionary services. Political constraints, apart from the SLC, are less binding at the interstate level, and the FCC has more practical freedom to price efficiently.

In all the above cases, it should be understood that restricting the firm's freedom to set rates diminishes economic efficiency in the long term. Rates set by regulators will not accurately reflect relevant economic costs and market conditions. In order to assuage political concerns, regulatory intervention imposes costs in terms of reduced productivity and makes the U.S. economy less competitive.

Competitive concerns also provide a legitimate rationale for regulatory intervention. The incumbent firm, if unconstrained, may choose to charge too high a price for interconnection services and other essential inputs used by competitors. Regulators must limit the firm's freedom simultaneously to raise these prices, while lowering output prices.

Similarly, the firm might choose to price services that are subject to intense competition below marginal cost if it could simultaneously raise prices of services that are subject to

less intense competition.⁷⁷ Regulators may, therefore, choose to limit the firm's freedom to restructure rates in this way.

Under ROR regulation, these concerns would be addressed on a case-by-case basis. Under price caps, undesired price restructuring is limited by baskets and bands. Creating the following set of baskets would suffice to meet the above-mentioned goals:

- 1) Politically sensitive services and interconnection charges;
- 2) Other noncompetitive services;
- 3) Emerging competitive services; and
- 4) Competitive services (subject to streamlined regulation, not subject to price-cap regulation).

Pricing flexibility would be explicitly limited in Basket 1. Individual rate elements could be governed by specific regulatory guidelines. As previously discussed, economic efficiency and productivity will be greater, the fewer "politically-sensitive" services are included in this basket.

Interconnection prices should be set so as to avoid the possibility of a vertical price squeeze. In general, if charges to competitors for use of essential facilities embody a contribution over and above cost, the same contribution should be imputed to the incumbent firm's output prices.⁷⁸

Basket 4 services should not be subject to price regulation. They should receive streamlined treatment, as previously discussed. Competitive forces, rather than regulation,

⁷⁷This is a traditional regulatory concern, but it is far from clear that the firm has any profit incentive to price in such a way. See Michael A. Einhorn, ed., *Price Caps and Incentive Regulation in Telecommunications*, Kluwer Academic Publishers, 1991, p. 234. In any event, regulatory policies that prevent the firm from pricing below marginal cost do no economic harm, apart from regulatory delays and administrative costs.

⁷⁸This rule is consistent with static profit maximization. It limits the regulated firm's freedom to sacrifice profits in a way that reduces the scope of competition. For fuller discussion of this issue, see William J. Baumol, *Deregulation and Residual Regulation of Local Telephone Service*, AEI Studies in Telecommunications Deregulation (March 3, 1993) and William J. Baumol and J. Gregory Sidak, *Toward Competition in Local Telephony*, (Cambridge, MA, MIT Press, 1994), Chapter 7, "The Pricing of Inputs Sold to Competitors," pp. 93-116. When effective competition exists for all inputs in a particular market, no facilities are essential.

should be relied upon to protect consumers. Basket 4 would also include discretionary services, as described earlier.

Basket 3, emerging competitive services, would include services that face some competition, but do not yet meet the conditions for streamlined regulation. Basket 2 would include services that face no competition.

The regulated firm should be allowed substantial pricing flexibility in both Baskets 2 and 3. Since the baskets are separate, there is no danger of using noncompetitive services to subsidize emerging competitive or competitive services. There is no danger that emerging competitive services can be used to subsidize competitive services.⁷⁹

The general principle is that markets should be separated, based on the extent of competition and/or whether the services are discretionary. Then, pricing flexibility can be afforded to *all* services (except Basket 1) — not just the more competitive services. Pricing flexibility leads to more efficient pricing even for noncompetitive services — once the dangers of cross-subsidy or a vertical price squeeze are averted through the use of separate baskets and maintenance of efficient price spreads.

To implement this basket structure effectively, one needs to substantially disaggregate services across markets. Some services will face competition only in selected geographic areas. Ideally, the service should be deemed competitive or emerging competitive only in geographic areas where competition actually exists. In other areas the service would be deemed noncompetitive. Since competition is growing so rapidly, the services to be included in each basket should be reviewed every year. Over time, more and more services would be assigned to the emerging competitive and competitive baskets, as competitors enter new markets and grow in their existing markets. Each year, the companies should be given a chance to disaggregate services; so some markets for a service (e.g., the service in particular geographic areas) can be placed in the competitive basket.

⁷⁹In formal economic terms, cross-subsidy occurs when some services are priced above stand-alone costs, while other services are priced below incremental costs. The former services subsidize the latter. If under the initial rates, neither basket subsidizes the other, the basket constraints prevent the firm from restructuring rates so that one basket subsidizes the other. Basket constraints also preclude many types of price-restructuring that do not involve cross-subsidy

VI. CONCLUSIONS

In recent years, many regulators have realized that rate-of-return regulation is wholly inappropriate for the telecommunications industry. A different approach is needed, as the industry enters the Information Age. The FCC and state regulators have tried many different versions of regulatory reform. Results have generally been successful. Incentive regulation has been an appropriate step in the right direction. Further steps in the same direction could yield much larger public benefits. To reap those benefits, regulators must avoid resting on their laurels by simply fine-tuning existing plans. What is called for are bold *new* steps to further regulatory reform.

This paper presents a vision of where regulation should be 5 years from now. Because of inevitable procedural delays, progress must begin immediately if this goal is to be achieved. The vision provides a compass for evaluating shorter-run reforms. We also suggest some specific short-run reforms that would significantly move regulation in the direction of our long-run vision.

A. Growth in Competition

Any plan for regulatory reform should anticipate and facilitate changes in the market by providing appropriate regulatory flexibility. Local telecommunications is currently undergoing profound changes that will revolutionize the industry structure. Removal of state and federal regulatory barriers to entry is fueling growth in competition. Technological and policy developments will strengthen the array of competing services. Competing access providers (CAPs), cable and wireless services industries are already thriving and hold excellent prospects for the future.

CAPs have for some time succeeded in bypassing local exchange carriers (LECs) by directly connecting private facilities to long-distance carriers. Now, by taking advantage of new interconnection opportunities, they can offer switched access and local services as well. With their established presence in most major markets and their substantial financial resources, CAPs are poised for large-scale, head-on competition with LECs.

Competition from the cable industry will also intensify in the near future. The number of homes passed and number of homes served by the cable industry have both grown rapidly. Cable now has a large presence in residential areas. Increased use of fiber in cable networks positions the cable industry to provide local exchange services at low incremental cost. The recent spate of proposed mergers and other joint arrangements between LECs and cable companies portends an acceleration of competition jointly by cable companies and out-of-region LECs.

The wireless industry will soon bring a vast new universe of competition to local services. The rapid growth of cellular telephony demonstrates the popularity of mobile communication. Advances in digital technology will allow additional capacity for increased traffic. The FCC has adopted a policy of expediting Personal Communication Service (PCS) deployment, and recently decided to increase the spectrum available for wireless technology by four-fold. These and other developments (*e.g.*, Motorola's sale of spectrum to Nextel) will drive down the price of wireless service and equipment. We expect that within 10 years, wireless services will provide reasonably-priced alternatives to LEC landline services. The entire landscape of the telecommunications industry will be transformed as a result.

In sum, LECs will face increasingly potent competition. Growth of local-services competition is likely to far outpace the early growth of long-distance competition.

B. Efficiency Incentives

Effective plans for reform also must take into account the incentives for efficiency under different regulatory scenarios. Under traditional rate of return regulation, the company is allowed an opportunity to earn a "fair" return on operations. While providing some benefits, this method of regulation significantly dilutes the firm's incentives to be efficient. Increased efficiency often requires difficult changes in established business and personnel patterns. Without a sufficient financial incentive, such changes are unlikely to be made. Our measurements indicate that rate-of-return regulation (with a one-year lag) affords only a small percentage (about 14 percent) of the efficiency incentives that exist in unregulated competitive markets. Greater incentives can be provided through alternative regulatory approaches.